coal containing up to 30 or 40 per cent ash may be thus utilized. The moisture content with coal is generally brought down to i per cent by previous drying, but in the case of lignites and peat a higher percentage of water may be accepted. The standard fineness adopted is 82 to 85 per cent through a 2oo-mesh screen (40,000 holes per square inch) and 95 per cent through a loo-mesh screen. Three methods are in use for conveyance of the dried dust to the burners, viz. (i) screw conveyors from bins; (2) combined pulverizers and fans on the induced-draft principle; and (3) the pneumatic system, in which the pulverized fuel is carried along suspended in air and simply tapped off as and where required. The " primary " air so used is about half the total needed for complete combustion, the balance being admitted into the furnace from a secondary air main. From 20 to 40 per cent saving has been cited in comparison with solid coal by using the fuel in this finely divided state.

LIQUID FUELS

A practical division of liquid fuels would be into those which have been purified by distillation and are sufficiently volatile to be used as vapours in the cylinders of internal-combustion engines, and those whose volatility is so low as to require breaking up mechanically into minute liquid globules for rapid combustion. The first group contains the petrols, benzol, alcohol, alcohol-benzol mixtures, white spirit, paraffin and kerosene oils; the second the crude fuel oils, obtained for the most part by " topping " or distilling off the more volatile portions of the natural petroleums found in various parts of the world. These distillates yield petrol, kerosene, and other grades of refined mineral oil. Benzol is similarly obtained from the light oil of coal tar and is sold as 90 per cent and 50 per cent benzol, terms which imply that in the one case 90 per cent and in the other 50 per cent distils over at 212° F. from a glass retort, the thermometer bulb being immersed in the liquid. 90 per cent benzol contains about 75 per cent of actual benzene, having the composition C 92*3 per cent, H 7*7 per cent, and 24 per cent of

toluene (C 91-3 per cent, H 8-7 per cent) with i per cent of higher hydrocarbons. Pure alcohol, free from water, contains C 52*17 per cent, H 13-04 per cent, and O 34-79 per cent. The petrols consist almost entirely of hydrocarbons, but the products from different oil-fields show differences in constitution, a paraffinoid structure prevailing in American oils, naphthenic in Russian, and benzenoid in that from Borneo. The calorific value of petrol is about 19,500 B.Th.U.

Fuel **Oils.**—Heavy fuel oils suitable for combustion in furnaces are got from Borneo, Burmah, Persia, California, Texas, Mexico, Trinidad, Russia, Galicia, Roumania, and elsewhere. Scottish shale and blast-furnace oils have also been used. As the fuel oils have generally been subjected to topping, their analyses afford no information regarding the composition of the raw oil from the various fields, and the titles given below must be taken as indicating only the alleged source of supplies offered in the market. The